The Evolution of Dirt:
Real Estate in the Age of Disruption

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ABSTRACT

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"We shape our buildings, thereafter they shape us." -Winston Churchill

A physical building is designed to weather the test of time, however, it becomes obsolete when it no longer provides an environment that people demand. Real estate developers are always trying to anticipate future consumer demands for space. It is hard to predict with any certainty how future technological innovations will affect those demands. This forces developers to rely on historical data, personal experience, and an innate "gut" feeling as to how to design a building. In this current climate of rapid technological innovation, how people occupy and use space is changing right in front of our eyes, and the consequences of that innovation should serve to separate the winners (innovators) in the real estate business from the losers.

This thesis examines various ways in which twenty-first century technology innovations are transforming the real estate industry.

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As graduation approaches, I am reminded of all the support and guidance I have received at the University of Texas. In particular, I would like to thank the following people:

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INTRODUCTION

Real estate is one of the most valued commodities in the world. It is, for the most part, a finite resource, and its value often depends upon not only its location but also its utility. In early civilizations, ownership and control over land was a primary means of accruing wealth and passing that wealth from one generations to the next. For centuries, bloody wars were fought to control territory. In the 17th century, Pilgrims fled England in hopes of acquiring land and prosperity in the Americas. A real estate company, the Virginia Companies of London and Plymouth, financed and founded the earliest American colonies.[1]

Structural changes in economics are threshold moments altering how markets function. “These changes are often sparked by new economic developments, global shifts in the pools of capital and labor, changes in resource availability due to war or natural disaster, or changes due to the supply and demand of all resources.”[2] Structural changes transform how we live as a society which in turn impact real estate. The Agricultural Revolution led to the earliest forms of sustainable cities; the first two Industrial Revolutions not only spurred demand for manufacturing plants but also transformed means of travel connecting cities and creating the need for new cities along trade routes. Today, we are experiencing what policy and business leaders are calling the "Fourth Industrial Revolution" comprised of the internet of things and machine learning.

Real estate will always be a valued commodity and consumed by everyone, but the way in which it is defined and used will evolve. This thesis – in two parts - looks to understand what

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[1] Glaeser, Edward L., (2016) “Real Estate Bubbles and Urban Development,” NBER Working Paper No. 22997

[2] Chen, James. “Structural Change.” *Investopedia*, https://www.investopedia.com/terms/s/structural_change.asp. Accessed 13 May 2019.

new trends in regards to sustainability, technological innovations, and basic human desires will drive future real estate development and returns.

The first industrial revolution shifted demand from agricultural mineral-rich land to the early versions of industrial warehouses and manufacturing plants located on river banks. As jobs developed people left farms and began moving into the city so houses city blocks were developed. Understanding how real estate development follows or anticipates human behavior is what this thesis looks to answer first. Humans have come a long way since being an agrarian society, so how will real estate evolve to accommodate future innovation and consumer demand, and how should developers anticipate future trends in consumer behavior?

The second part of this paper will analyze Silicon Valley startups and their impact on the usage of space. My thesis will acknowledge industry disrupters, such as Airbnb and WeWork, that are transferring more power from real estate companies to the average person. The new age of technology is just getting started and will disrupt real estate in physical and intrinsic ways. Real estate developers have had the same decisions for decades, either adapt to consumer demands or become obsolete. E-commerce has led to the “demise” of brick and mortar storefronts, Airbnb has brought tumultuous pain to the hotel industry by directly increasing the supply of places for vacationers to stay, and now WeWork is disrupting traditional office space. Will Silicon Valley startups cannibalize commercial real estate, or will the industry evolve to the changing environment?

PART ONE

HUAMN BEHAVIOR

“To create, one must first question everything.” – **Eileen Gray**

Wall Street Exodus

I was recently in New York with fellow classmates for a case competition which was being held a few blocks south of Wall Street. As business students, we were excited to tour the heart of capitalism. After the competition, we decided to grab a beer and see the New York Stock Exchange (NYSE). We expected to see "suits" bursting with New York energy, but the second we turned the corner onto Wall St., our hypothesis was proven wrong. The financial pulse of the world was deceased. The eerie feeling my experience left me yearning to understand how the birthplace of modern capitalism could become urban blight, so I began researching Wall Street's rise to world prominence and decline.

The first stock exchange – west of the Atlantic – dates back to the late 1700s. Over the next few centuries, stock exchanges became more regulated and localized. To my surprise, the first stock exchange in the New World was in Philadelphia, not New York. The New York Stock Exchange set up shop on the southern end of the Manhattan peninsula. Wall Street's proximity to the East and Hudson rivers made it a hotspot for domestic and foreign merchants to meet and trade. Location is why the NYSE, not the Philadelphia Stock Exchange, thrived. J.P. Morgan headquarters – located at the intersection of Wall St. and Broad St – became known as "the Corner." The twelve foot high boundary at Wall Street came down allowing for city expansion. Colonists left the crowded business district and found residence in what is today Midtown.

"There was a river at one end and a graveyard at the other. In between was vintage Manhattan: a deep, narrow canyon, I watched yellow cabs smacked into raised sewer lids, potholes, and garbage."[3] Downtown Manhattan became outdated as the city gravitated to newly developed boroughs. Pre-internet, companies that did business together needed to be an arm's length away from one another. Wall Street continued to be home base for financial firms for the next two centuries until the computers made physically trading obsolete. No longer being dependent on proximity to Wall Street, brokers flocked to more desirable parts of the city, and Wall St. slumped into a state of urban decay. On a macro-level, Wall Street became the financial "Corner" of the world due to New York's proximity to the Atlantic and wall street's proximity to water ways. On a micro-level, Wall Street fell behind newer developments up the road.

The Wall Street exodus illustrates how even the most desirable of locations can evolve. Today, companies are trading Broadway for the Grand Ole Opry and 6th street, in Nashville and Austin respectively. The first part of this thesis analyzes the how product and location desirability are tethered to structural changes in human behavior and economics.

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[3] Michael, Lewis. *Liar's Poker*. Penguin Books, 1989.

Chapter One

Human Capital Era

"What talent wants, landlords need, and developers must build" – Chris Kelly

It is a frequently observed phenomenon that one's built environment encourages certain behaviors and ways of living, and in an age where consumers are increasingly interested in buying products from companies whose values reflect their own, employees want to work for companies whose brand aligns with its office space. As a result, "Corporate real estate is increasingly becoming an important tool to attract high-quality talent. This alignment of real estate and business strategy is driving several critical trends, influenced by technology, that impact how space is designed and utilized."[4] Premier office space will become increasingly more important as human capital continues to drive company office locations.

Millennials are the largest generation in the labor force.[5] Suburban offices were built supplying companies with opportunities to meet baby bomber employment demand in the suburbs, but millennials are favoring the urban environment for places of employment. Suburban office real estate is trying to attract young graduates by creating mixed-use offices that offer college campus like amenities: gyms, coffeehouses, and outdoor collaborative spaces.[6]

Until recently, companies viewed real estate as cost associated with a factor of production. Manufacturing companies locate near rivers and timber companies settle in the northwest where timber is abundant, retail companies pay a premium to be located in real estate that drives traffic to its store and generating customers and revenue, and offices conglomerate around other businesses for ease of working together and also near educated workforces (large universities).

Facebook, Amazon, Apple, Netflix and Google (collectively referred to as FAANG) put less emphasizes on analyzing real estate as a factor of production and more on branding and

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[4] "Space Matters." (2018). *Cushman & Wakefield.*
[5] "Millennials Became the Largest Generation in the Labor Force in 2016." *Pew Research Center*, Accessed 10 Apr. 2019.
[6] "New Jersey Has a Millennials Problem" *WSJ.*

culture. Tech companies are not constrained to any one region or climate, and can do their business anywhere making it hard to predict where these companies will locate on macro (state/city) and micro (neighborhood) levels. These companies bring high paying jobs to a market and other services like restaurants, grocery stores and bars follow their footsteps, so when one of these companies physically enter a new market, the real estate around their presence skyrockets.

> Silicon Valley tech companies realized a decade ago if they wanted their employees to be at their most effective, they had to give them everything they wanted from one place, Rob Speyer, president and CEO of Tishman Speyer.
>
> "Tech companies built a community in the workplace and that became a critical employee recruitment and retention tool," he said. "Meanwhile, we were all providing four walls and a floor."

In this new age of transparency, tech companies are particularly careful in creating a sustainable brand. Decades of harassment in the workplace in male dominated industries has been brought into the light and now progressive companies are working towards changing that narrative. An abundance of light, collaboration, and mindful of the environment are some drivers that shape their office developments. Since Tech companies live off understanding consumer behavior, what can real estate developers and other industries learn from how these companies design their offices?

The median age for employees at FAANG companies ranges from 28 (Facebook) to 31 (Apple and Amazon). Since these tech companies fight to attract the Millennial demographic, their office buildings are a good example of what type of environment educated, millennials want to work in. Industry disrupters are consciously thinking what consumers want but don’t know exist, so it should be no surprise their office space reflects what employees want and provides an atmosphere that generates the greatest productivity in the workplace. Since FAANG companies are focused on creating efficiency and human behavior, it makes sense to analyze their office spaces and draw conclusions on how real estate developers can replicate prominent design features.

Facebook Menlo Park:

Located in Silicon Valley, Facebook's new 2,800 employee office is the largest open floor plan in the world. The project was designed by world famous architect Frank Gehry. Facebook said the goal of the building was to "create a space that's eco-friendly and reflects Facebook's mission to connect people." The building has over 100,000 native plants that insulate the 430,000 square foot building. There is also a nine-acre green roof and walking loop.[7]

[7] Boorstin, Julia. "Inside Facebook's Futuristic New Headquarters." *CNBC*, 22 May 2015.

Apple Park:

Located in Cupertino, California, Apple Park's nature infused design with eighty percent of the land is devoted to green space. The 2.8 million square foot "nature refuge" houses over 10,000 employees and is commonly referred to as a "spaceship." The Ship is fueled by 100% renewable energy.[8]

[8] *Apple Now Globally Powered by 100 Percent Renewable Energy - Apple*. https://www.apple.com/newsroom/2018/04/apple-now-globally-powered-by-100-percent-renewable-energy/. Accessed 14 May 2019.

Google

Google office designers are believers in Louis Sullivan's "form follows function" approach to architecture, and design their office communities to "create the happiest, most productive workplace in the world.[9] Google installed intentionally slow elevators in its Manhattan office to encourage communication between coworkers, and maybe the slow ride down on a Friday gives a group of people enough time to invite one another to grab a drink. Real estate developers need to start being more conscious of human psychology.

[9] *At Google, a Place to Work and Play - The New York Times*. https://www.nytimes.com/2013/03/16/business/at-google-a-place-to-work-and-play.html. Accessed 24 Apr. 2019.

Chapter 2:

Location, Location, Location

"I always felt uncomfortable with real estate because buildings don't move, and neighborhoods change." – Stephen Schwarzman (CEO and Founder Blackstone)

Introduction

There is an old saw in real estate “location, location, location.” Physical buildings deteriorate over time whereas location can either appreciate or depreciate. Real estate in cities that were once economic powerhouses tumble as the city becomes less desirable (e.g., The Motor City). This chapter analyzes the rise of secondary cities and how municipal governments can work with private real estate developers to build cities that accommodate all citizens.

This is the first time in the history of mankind that location is driven by people, not access to jobs or natural resources. Investment and opportunities are following where the talented human capital wants to be. Gateway cities are still premier real estate markets, but there is a new structural population shift from expensive markets to places where the dollar goes further. Second tier cities provide tremendous opportunities for early investors to enter growing markets where there are less Wall Street investors competing for deals.

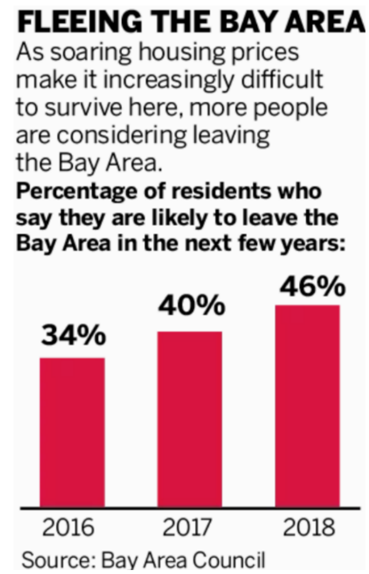
Amazon’s Search For HQ2

In an age where technology companies are flourishing, demand for highly skilled tech-focused labor seems to outlast supply. As a result, companies are opening offices in cities where the pool of highly qualified tech workers is abundant. Just as companies are fighting for talent, cities are competing to land new corporate offices. In 2017, Amazon announced it was searching for a place to build a $5B headquarters (HQ2). Over 230 cities applied in hopes of attracting Amazon’s investment and the estimated 50,000 jobs with an average salary of $100,000. Cities offered unprecedented incentive packages from enormous tax breaks to a small town in Georgia offering to rename itself Amazon.

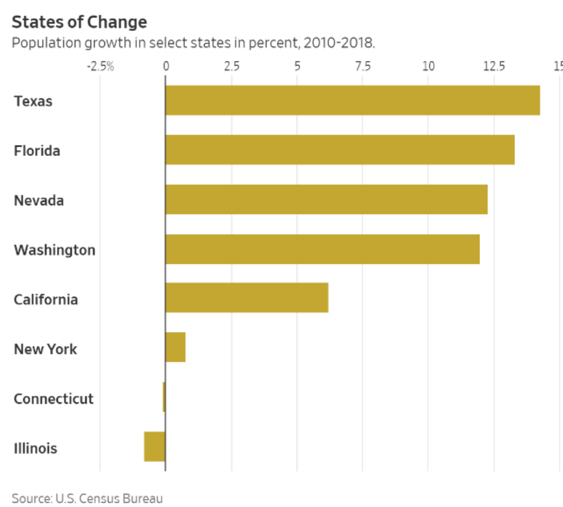
Amazon's open requirements were cities with, good airport connections – daily flights to NYC, Seattle, and D.C., efficient public transportation, and proximity to innovative universities. Other criteria such as population greater than a million and communities that are "business-friendly." Most likely looking at a ground-up development play, Amazon requested a one-hundred acreage "shovel ready" site. For reference, one-hundred acres is one-eighth the size of Central Park. For a year Amazon deliberated where to plant their flag, and not a day went by without media outlets speculating what city would win. A fifteen-month journey ended with Amazon choosing Crystal City and Long Island for its next two headquarters.

Silicon Valley

Depicted as techies riding bikes to their state of the art office where slides and beanbag chairs are ubiquitous, Silicon Valley, located in Palo Alto, California, at the southern end of the San Francisco Bay, almost sounds like an imaginary place. Palo Alto is an affluent community where everything is competitive, from adolescents attending top tier schools to parents working tremendously hard to afford the astronomical lifestyle. People that move to Silicon Valley in search of landing a job at the most innovative companies in the world tend to burn out and flock to cities that offer a better quality of life. As tech jobs grow exponentially, the number of houses does not; in six years – 2010 to 2016 – employment in Silicon Valley grew 30% while the number of housing units increased a mere 4%.[10] Naturally, due to the fundamental laws of supply and demand, Palo Alto became one of the most expensive places to live in America.



As more people and companies seek asylum in cities with lower costs of living, non-gateway cities like Austin, Charlotte, Denver and Dallas have become hot targets for real estate investment. "A study this month by business relocation consultant Joe Vranich estimates that 1,800 businesses shifted jobs or capital out of California in 2016 and about 13,000 companies have left the state since 2008. Over the last decade $76.7 billion in capital and 275,000 jobs have moved out of the state."[11]



In accordance with Newton's Third Law of Motion[12], not everyone is benefiting from urbanization and real estate appreciation. Unlike manufacturing jobs that brought middle-class people to a city, tech companies are bringing young people with high paying jobs. Luxury apartments are replacing old apartment units resulting in causing an affordable housing shortage. Another reason for the affordable housing

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[10] *Former Palo Altans Trade Silicon Valley Lifestyle for Better "quality of Life" Elsewhere | News | Palo Alto Online*. https://www.paloaltoonline.com/news/2018/08/10/why-they-left. Accessed 14 May 2019.

[11] *High-Tax State Exodus - WSJ*. https://www.wsj.com/articles/high-tax-state-exodus-11546037709. Accessed 18 Apr. 2019.

[12] For every action there is an equal and opposite reaction

shortage is rising land and construction costs, and developers are not seeing good enough returns to build middle-class apartment buildings.[13]

[13] Tim Berry is the Founder, President and CEO of Pennybacker Capital, LLC.

Chapter 3:

Development

"Throughout the history of the United States, where the great majority of land is privately owned, the buildings that make up American cities have been planned, designed and built almost entirely by developers, using private capital, one project at a time… a real estate development is a private enterprise that is acted out on a very public stage" (Peter Brown).

Introduction

Atomistic developers and inelastic supply lead to overbuilding which does not allow for incremental growth. When intensifying demand for space raises, market rents jump to an attractive rate which signals developers start building, but since it takes multiple years to construct a building, markets can be drastically different from when the developer first got city hall's approval. "Demand for space goes up in a short-term fixed-supply market, price goes up and signals production sector for new supply, + 2 or 3 years = new supply comes online to meet new demand, prices stop going up as demand and supply roughly equilibrate."[14] Fixed supply and atomistic builders are the crux of the real estate cycle.

For example, real estate development in the 1980s increased building supply by 50%. In just ten years, American developers doubled the size of the country's real estate footprint. The built environment has lasting consequences – good and bad – on future growth. Since the design for new developments reflects current usage of space, buildings with the same vintage tend to mirror another.

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[14] Greg F. Hallman

Public-Private-Partnerships

"It is far easier, simpler to create spaces that work for people than those that do not – and a tremendous difference it can make to the life of a city." – Holly Whyte

One century ago, only 28% of Americans lived in urban cities; today, over 80% of Americans live in urban environments.[15] As cities become more densely populated, municipalities will have to figure out how to accommodate its citizens while benefiting from the economic impact that development generates. Quality of life is a determining factor in real estate values and economic vitality. A 1998 real estate industry report calls livability "a litmus test for determining the strength of the real estate investment market…. If people want to live in a place, companies, stores, hotels, and apartments will follow."

Mixed-use

The "live, work, play" mentality generated the popularity of mixed-use development in the modern era. The concept "mixed-use" seems to be new to real estate, but its origin traces back to ancient European cities. Before the invention of the automobile, humans had to live within walking distance of their place of work. This is noticed when you walk through cities like London, Paris, or Venice. Retail on the ground level and either apartment units or office space fill out the upper layers. Mixed-use buildings accommodate urban densification.

The reemergence of mixed-use development provides a rare optionality in real estate. The Domain, located in Austin, Texas, is a mixed-use development. Instead of developing one

[15] Ibid.

product type or all of the land at once, local Austin based Endeavor real estate group rolled out the project in stages. This allows for the developer to build a little of each real estate type and wait to see what product is optimal to build more of when the market reacts.

As more people start moving to cities, mixed-use developments will be needed to cope densification.

Natural elements – lakes, rivers, mountains – and artificial barriers – highways and skyscrapers – can divide and landlock cities. These barriers impede development and segregate economic prowess. As unencumbered land becomes more scarce, developers need more zoning assistance from the public sector. The success of future cities hinges on beneficial public-private partnerships between real estate developers and local municipalities. The private sector's ambition and the public sector's power authority, creates a mutualistic relationship that can positively impact a community.

New developments carry a great deal of risk and the larger the development the larger the risk, so developers mitigate risk by developing smaller scale projects in areas where demand is already present. Public-private partnerships reduce risk associated with large scale developments making them more attractive for developers, and in return, new large-scale developments can reshape an entire area which encourages additional development projects. New investments generate tax revenue for cities which can be used to subsidize affordable housing projects.

Mass production of the automobile and postwar economic policies lowered barriers for people to move out of densely populated cities and into the suburbs. The Federal Highway Act of 1956 spurred massive investment in developing extensive highways between cities across America. As suburbs became the preferred way of living, services that cities offered – schools, restaurants and grocers, medical services – were now being developed in suburbs. In the following twenty years, the expressway building boom segregated and bound downtown districts. At the time of the highway expansion program, central business districts were much less dense and the highways circling CBDs did not pose significant impediments to future growth.

To reconnect areas of a city that were separated by freeway development over fifty years ago, highway cap parks – deck parks build over freeways – have been an effective way to bridge two sides. Urban parks today mirror town squares in early European cities, vibrant and welcoming, encouraging socializing and interaction. Urban parks are a testament to the mutualistic relationship a public-private partnership engenders.

> William Whyte discovered that urban parks – no matter the size – were an integral component for promoting human interaction with the modern city. Large, small, verdant, or paved, these urban spaces provide places for people to meet and mingle, as well as stimulate connectivity between the various single-use components of the site. [16]

Urban parks can be a top attraction for tourists. Almost forty percent of Manhattan hotels are located within a short walk to Central Park. In 2010, the average nightly rate was around $400. On an annual basis, more people[17] visit Central Park than the Grand Canyon, Yosemite and Yellowstone National Parks combined. Following a massive conservation overhaul of the park, real estate values for properties closer to the park, between Columbus and Central Park West, increased 73% faster than properties a block off the park.[18] With the increases in property

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[16] Langford, Paul. *Good Design Is Good Business: An Analysis in Mixed-Use Architecture*. University of Texas at Austin, 2017.

[17] Thirty-five million people visit Central Park each year.

[18] SHEFTELL, JASON. "Central Park: The World's Greatest Real Estate Engine." *Nydailynews.Com*, https://www.nydailynews.com/life-style/real-estate/central-park-world-greatest-real-estate-engine-article-1.178103.

values comes more tax revenue for cities. Cities can recoup their investment with real estate taxes, private events at the park, and licensing deals. Green space economics provides evidence that people will pay a 15-20% premium to live near city parks. The city capitalizes on property appreciation via ad valorem taxes on real estate. In Latin, ad valorem means "according to value", and ad valorem taxes increase as the property values appreciate.

Klyde Warren Park – Dallas, TX

Overbuilding in the 1980s left downtown Dallas with a glut of office buildings. Post millennial, development activity concentrated on the northside of Stemmons freeway leaving the downtown side outdated and undesirable. Office rents and occupancy lagged the uptown market. John Zogg – managing director at Crescent real estate – and a few other people saw the desire line for an urban park that would not only bridge the decaying downtown real estate with the prospering uptown market but also the demand for new developments along the park. "Klyde

Warren is one of America's superstar parks," says Ed McMahon, a leading park expert at the Urban Land Institute in Washington, D.C. "It's done an enormous job of reconnecting downtown Dallas, generating millions of dollars in property value and providing a new front porch for the city."[19]

Stats[20]:

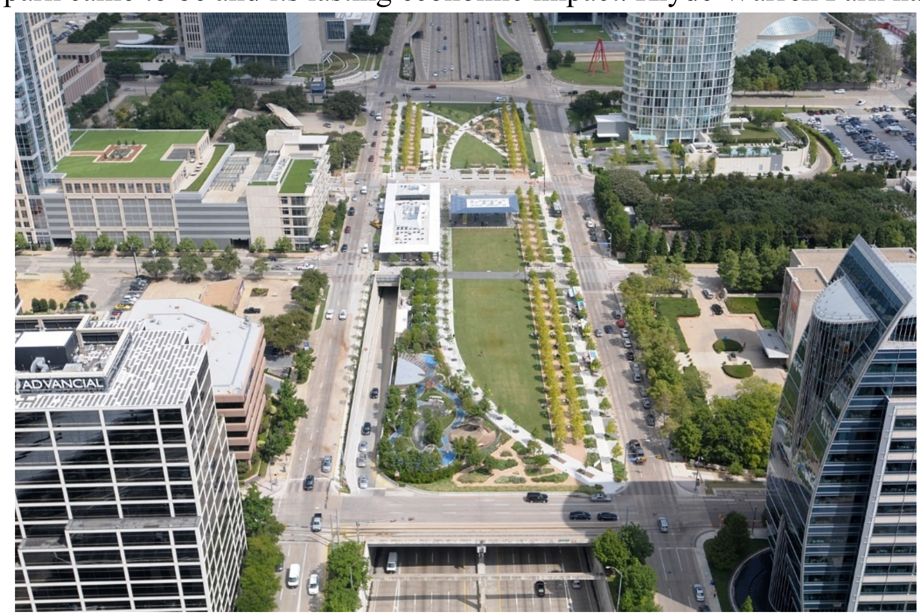
Size: 226,512 square feet, 5.2 acres

Construction Costs: $106.7 million

Funding: City of Dallas - $20 million; TxDot: $20 million;

Private Donations: $50 million; Stimulus Funds: $16.7 million

I recently interviewed one of the visionaries for Klyde Warren Park, John Zogg, and got his insight on how the park came to be and its lasting economic impact. Klyde Warren Park has created $2B+ of economic impact and spurred $1B value creation in new developments and added $1B value to existing products. The city only had to



[19] *Dallas' Klyde Warren Park Spawns a New Generation of Urban Parks | Business | Dallas News*. https://www.dallasnews.com/business/business/2018/12/09/klyde-warren-spawns-new-generation-urban-parks.

[20] "Klyde Warren Park." *Reconnect Austin*, 11 Sept. 2017, https://reconnectaustin.com/precedents-2/klyde-warren-park/.

put up $20M into the project and city officials say, “that was the best $20M it ever spent.” McKinney & Olive, developed by Crescent real estate, is a testament to the 1B impact the park had on new developments. McKinney & Olive is one of the most premier office buildings of the decade. It is 536,000 square feet and is 100% leased. When I asked Zogg if McKinney & Olive would be the gem today if the park was not there, he said, “I’m sure there would be some kind of product there today but nothing like McKinney & Olive. That goes for a lot of the nearby buildings.” The park acts as a town square connecting the Arts District and the vibrant Uptown neighborhood. The success of the project has led to an expansion of the park.

> “Klyde Warren Park is a great example of what we can achieve when the federal government, local communities, and private companies work together toward a sustainable future. … The project will provide long-term benefits for the residents of Dallas.”- Ray LaHood, Former U.S. Secretary of Transportation.

Part Two

Disrupters

Disruption of Space

According to Moore's Law, the number of transistors that can fit on a semiconductor doubles every 18-24 months. As the number of transistors added to a semiconductor Computing power increases. Early computer models were larger than today's yet less powerful.

A similar shrinkage of space applies to the built environment, too. About 1/3 of living room space used to be devoted to cabinets storing book, DVD, and record collections. Fast-forward to the cloud computing age where everything is stored in data centers and accessed via satellite. Streaming services such as Netflix, Spotify, and Kindle allow for on-demand digital access to any song, movie, or book (Branson). As a result, apartments are roughly 10-15% smaller today than they were ten years ago. As more stuff becomes stored digitally, the switching costs associated with moving from one location to another also decrease.

The computer revolutionized how office space is developed and used. Before the computer age, lawyers needed more space to store legal books and large file cabinets. When computer databases transferred all physical books and files digitally thus reducing the amount of physical space per employee. Cushman & Wakefield recently published a report on office densification which showed that in 2017, law firms signed leases that were 1/3 smaller (space per employee) than their previous lease. Other industries, like tech, finance, and advertising, have lowered space per employee by switching from private offices to the open-floor model. The open-floor – or collaborative – style is impacting real estate in many ways. For starters, it is not replicable in older buildings that have large columns because the columns impede collaboration. The model also encourages employee densification which some buildings were not built to withstand, in terms of parking ratios, elevator capacity, and other general infrastructure issues.

Up to this point we have learned how our built environment relatively static but human behavior is dynamic. The next part of this thesis will analyze how developers can build buildings that will be more flexible to future unknown usage of space.

Options in Real Estate Development

The valuation of dirt relies heavily on the local entitlement process. From property type to height restrictions, zoning permits land usage. In cities like Houston and Dallas, the only red tape you see is roping activist groups off from protesting your project. In highly regulated places like California and Austin, the entitlement and zoning process is laborious. I recently was guided to a paper titled "Urban Land Prices Under Uncertainty" which proposes how option theory applies to land valuation. The paper states, "land is more valuable as a potential site for development in the future than it is as an actual site for constructing any particular building at the present time."[21] Volatile markets create demand for optionality. In the securities market, call and put options are contracts on underlying security derivatives that can be used to mitigate a position's risk. Not knowing future demand or supply makes real estate value unpredictable thus creating volatility. Unlike securities, real estate is tangible and lacks an efficient derivative market. Instead of financial instruments to hedge investments, developers can increase the optionality of an asset – raw land or development strategy – by spending more upfront for future flexibility. The next few pages will look at how developers can develop spaces that provide greater flexibility better positioned to accommodate unknown future demand and behaviors.

[21] Titman, Sheridan. "Urban Land Prices Under Uncertainty." *The American Economic Review*, vol. 75, no. 3, 1985, pp. 505–514. *JSTOR*, www.jstor.org/stable/1814815.

Driverless Car and Parking Garages

The Federal Aid Highway Act of 1956 encouraged city workers to purchase cars and commute from the suburbs to work.

Whether we want to or not, a shortage of parking spots might lead to us using alternative means of transportation to access points of interests in densifying areas. Parking costs have been rising across the country for three reasons: densification, conversion of surface lots into buildings, and escalating costs associated with developing parking spots. These factors decrease supply while demand remains unchanged.

In real estate, "covered land plays" are used when people want to offset carrying costs associated with land ownership – taxes – with revenue streams. Surface parking lots, trailer home parks, and food trucks are typical examples of this strategy. The owner holds onto land as a call option on future value and usage. Increased real estate investment and growing demand to live in cities have generated higher demand for land; therefore, landowners are exercising their call option and selling to developers developer. The parking supply decreases as developers convert surface lots into luxury high-rises.

Employee densification in offices also impacts the amount of parking per employee. Parking ratios are on the number of spots per 1,000 square feet. The industry standard has been roughly 4:1 (four car spots per 1,000 SF), but due to more employee densification, this back of the envelope benchmark is not applicable. As office space becomes densified on a square footage per employee basis, the ratio of parking spots per employee will decrease. Since 2009 in America, the average area per employee has reduced by 8% (Cushman). Not only are there more people per square feet but also parking construction costs have increased. Sub-grade parking costs 90-100/sf. And the average parking spot is 350 sf., so each spot costs \$30,000 – \$35,000.[22] Consequently, as supply decreases and demand remaining unchanged, parking rates have ballooned. Parking prices in the Bay Area increased by 37% in 2017 (Cushman).

When I asked John Zogg asked what was the most prominent threat technology is proposing to real estate, he said: “Driverless cars are posing the biggest question mark/threat to developers.” Just like the vacant dead malls sprawled out across the U.S., deserted parking garages could be the next eyesore in the built environment.

Parking garages are expensive to build, and most developers would prefer not having to build garages and instead build more rentable space, but local zoning regulations usually mandate a certain parking ratio for new developments.[23] Therefore, parking garages are designed to minimize costs, and this leads to garages with low ceilings and sloped floors. Both characteristics make the space unconvertable to future real estate, and since most garages provide support for the building, demolishing is not an option. Below-grade parking will not be able to convert into any type of real estate except as storage space or maybe an underground gym, but not if the floors are sloped. Above grade garages, however, have the potential to be a future office or apartment. Convertible garages need to have flat floors (not sloped) with high ceilings (10-12 ft), open air for window space and a corkscrew-shaped ramped in the corner of the structure. Camden REIT is beginning to purchase this type of call option. Ric Campo, CEO of Camden, says, “We’re putting in better infrastructure systems that lead to lower operating costs.” Campo also concludes, “If you are growing your NAV and FFO at a faster rate than you would

[22] Brian Haulotte , LEED AP. Vice President / Preconstruction Services Director. JE Dunn Construction.

[23] “Camden Property Future-Proofs Parking Garages for Adaptive Reuse.” *Nareit*, https://www.reit.com/news/reit-magazine/march-april-2019/camden-property-future-proofs-parking-garages-adaptive-reuse. Accessed 15 May 2019.

otherwise—because you are being smart about how you build to maximize the efficiency of operating costs in the first five to 10 years—then all of sudden you are driving value and your stock price goes up."[24]

Some forward-thinking firms are beginning to utilize data analytics to forecast parking demand at any given time. For example, in mixed-use developments that consist of apartments, office, and retail space, developers are selling more parking passes than spots because data shows that people use spots at different times than others. Residents of the building use their spot only during non-business hours and office tenants use the garage during the workday.

Development companies will continue to grapple with whether driverless cars and reduced car ownership is a possibility or probability when it comes to building parking spaces. Since the future need for parking garages is uncertain, development options become more valuable, but since the average hold of a building is four years, I am not sure – at this point – we will see too many developers spending more on convertible parking garage construction, but as driverless cars begin taking a larger share of the marketplace, developers will either stop building parking spots or invest in convertible garages.

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[24] "Camden Property Future-Proofs Parking Garages for Adaptive Reuse." *Nareit*, https://www.reit.com/news/reit-magazine/march-april-2019/camden-property-future-proofs-parking-garages-adaptive-reuse

The Retail "Apocalypse"

"Real estate is the key cost of physical retailers. That's why there's the old saw: location, location, location." – ***Jeff Bezos***

How did e-commerce go from representing 3% to ~10% of all retail sales in the last decade? Shipping costs and long delivery times deterred consumers from online shopping, but then Amazon Prime changed the game. For one hundred dollars a year, Prime members receive free two-day shipping on almost all Amazon purchases.

Amazon recorded a net loss of $7.2B on shipping in 2016 up from $5B in 2015. Amazon can incur shipping losses since it has other profitable arms of the business. Amazon Web Services (AWS) posted an operating income of $7.3 billion (2018), accounting for 50% of total company profit.[25] AWS accounts for only 11% of total sales, but generates almost all of Amazon's operating income. Another profit driver comes via commission on products sold by third-party vendors and hosting advertisements. These other revenue streams allow Amazon to offer a service that loses billions of dollars. The demand for last mile (same day delivery or even one-hour delivery) is not currently economically practical for online retailers, but consumer demand for Prime forces other retailers to compete.

Without robust real estate companies, other retailers would not be able to compete with Amazon's delivery operations. Consequently, consumers would not be able to enjoy the convenience of shopping in their pajamas. Technology provides the platform for consumers to shop digitally but supply chain efficiency is what ultimately gets that product to the consumer,

[25] Condon, Stephanie. "In 2018, AWS Delivered Most of Amazon's Operating Income." *ZDNet*, https://www.zdnet.com/article/in-2018-aws-delivered-most-of-amazons-operating-income/. Accessed 16 May 2019

and without real estate development, companies would not be able to improve supply chain efficiency.

Last mile industrial space is specifically for getting an item to its destination in one stop. Unlike three- and five-mile industrial spaces, last mile real estate directly competes for land in highly densified urban areas. In developed major metropolitan cities like NYC and Chicago, real estate firms are having to become creative in how to find space for last mile operations. Amazon is scooping up vacant malls and transforming them into large distribution centers. Most malls are located near highway interchange systems which is ideal for e-commerce distribution.

Investors have traded retail REITs at significant discounts to Net Asset Value (NAV) in the wake of e-commerce dominance. In the last year, the Toys R' Us and Sears bankruptcies transformed millions of square feet into a retail wasteland.[26] Owners of these centers went from receiving rent checks to being stuck with dark spots and lengthy bankruptcy lawsuits. These two retailers provide great examples of how unpredicted innovations can wipe out companies and real estate.

Today is the slowest technology disruption will ever be. Innovation is only ramping up and will continue to challenge traditional businesses. E-commerce was the earthquake the sparked the first technology tsunami on real estate in which waves came crashing down on big box stores and class B malls during the longest bull market in history, and flooded storefronts left some landlords owners underwater. Now, **Airbnb** and **WeWork** have placed hotel and office space on notice.

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[26] *The Average Sears Store That Closes Will Put 68,000 Square Feet of Retail Space on the Market*. https://media.thinknum.com/articles/sears-closings-pose-challenge-to-reits/.

Part Three

The Sharing Economy

What's mine is yours, for a fee

Introduction

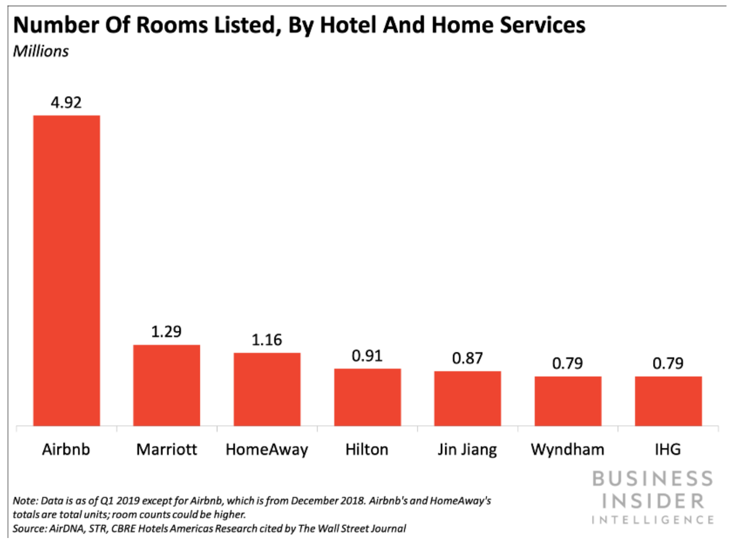
The new age of technology is just getting started and will significantly disrupt real estate.. Airbnb has brought tumultuous pain to the hotel industry by directly increasing the supply of places for vacationers to stay, and now co-working is disrupting established office space. Will these Silicon Valley startups cannibalize commercial real estate, or will the industry evolve to the changing environment?

Renting one's assets to someone else has been around for thousands of years, but has exponentially grown in the smartphone era. Apps like Uber and Airbnb provide peer-to-peer platforms connecting seekers with owners and facilitate the transaction. A report published by Price Water Cooper in 2015 estimates that global revenue in the sharing economy was $15B in 2013 and would grow to be more than $330B in 2025 (Wu, 2017). The Economist describes this type of marketplace as, "what is mine is yours, for a fee."

This chapter looks at how the sharing economy is disrupting demand for space.

Airbnb:

Two people without a place to spend the night in San Francisco envisioned a marketplace where homeowners could rent out their underused bedrooms to people looking for an alternative to staying at a hotel. Through the power of innovation and technology, Airbnb created a platform for homeowners to profit from their underused space. As the number of listings and users gained, the app began to steal supplier power from large hotel corporations.



Airbnb started in 2008, and within just ten years, the platform had more annual listings than the top five hotel conglomerates combined. An academic paper published by Boston University researched how Airbnb listings impact hotel revenue. The paper found that, "a 1% increase in Airbnb listings results in the association with the largest magnitude, a 5bps decrease in quartile revenue."[27]

If a hotel chain wants to increase supply, it would have to purchase buildings which is expensive and time intensive. Airbnb, on the other hand, can cheaply increase supply overnight. Airbnb increased total number of listings by ~500% between 2013 and 2014. Airbnb not owning the physical assets protects the company from liabilities associated with owning physical buildings like deterioration, real estate taxes, and capital market risks.

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[27] Georgios, Zervas. *A First Look at Online Reputation on Airbnb, Where Every Stay Is Above Average*. Boston University, 28 Jan. 2015

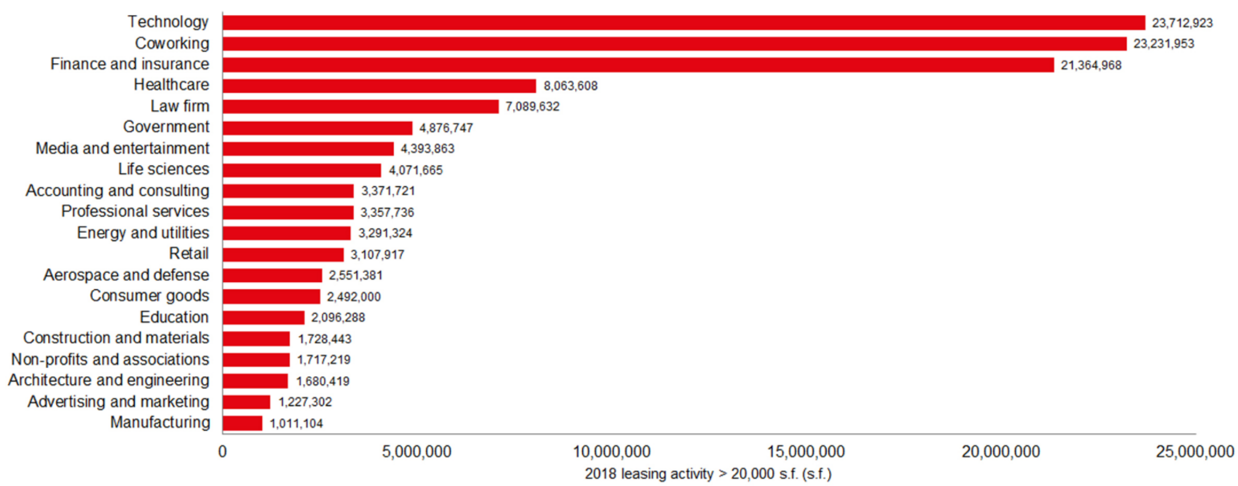
The largest owner of hotel rooms – Marriott – is taking its 2,000 listing home rental pilot to the world stage. Marriott's entrance into the home sharing business evidences their belief that there is money to be made in the sector. The hotel chain has a lot of work to do to compete with the home sharing giant, but Marriott's bet on the industry should give investors in Airbnb more confidence in the startup.

Chapter Four

WeWork, Won’t Work

Introduction:

In the office industry, no movement is concerning developers, landlords, and investors more than the growth of flexible office space providers. Since 2010, flexible office space has been growing at an average annual rate of 23%, and in 2018, the sector almost leased more office space than the entire technology industry.[28]



Like a health club, flexible office space providers sell people monthly membership passes to consumers looking for part-time use of space, and just as a gym provides fitness amenities, co-working companies provide office amenities such as conference rooms, bottomless coffee, and high-speed internet.

In what seems to be the "Golden Age" of startups, companies are starting, expanding, and failing at faster rates than ever before. Social media, e-commerce, and a boom in outsourcing options significantly lower barriers to starting a company.[29] The standard office lease has a ten-

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[28] Laughlin, Lauren Silva. "WeWork Builds Real-Estate IPO on Tech Foundation." *Wall Street Journal*, 29 Apr. 2019, https://www.wsj.com/articles/wework-builds-real-estate-ipo-on-tech-foundation-11556578594.

[29] Zwilling, Martin. "A New Era For Entrepreneurs And Startups Has Begun." *Forbes*, https://www.forbes.com/sites/martinzwilling/2013/12/25/a-new-era-for-entrepreneurs-and-startups-has-begun/. Accessed 12 Dec. 2018.

year lifespan. While most aspects of real estate have evolved to become more flexible in today's changing environment, the standard lease agreement has not. Companies that don't know what their company will look like in a year or how much space they will need, makes it hard for them to commit to long-term leases. Flexible office space providers such as Regus, Spaces, and WeWork recognize the problems in office leases and capitalize on consumer demand for optionality and provide long-term growth and short-term relief options for these companies; offering office space on a monthly basis turns the fixed cost of leasing real estate into a variable cost. Monthly leases allow for companies to grow organically and not let a lack of space deter them from hiring more employees. Vice versa, if companies are in a pinch – financially - they can leave the office space and work from home or at a coffee shop.

WeWork, referred to as the "Uber of real estate," is not the first of its kind but is the first to gain "unicorn" status. At the end of year one (2010), the startup had 1,000 members in two locations. By 2017, WeWork had 500 operational leases in over 90 cities, and this past November, WeWork surpassed J.P. Morgan as the largest office tenant in Manhattan. Despite WeWork's inability to generate positive cash flow, it carries a $46B private valuation which begs the question, is WeWork's model sustainable? This chapter will analyze whether co-working companies can attract and maintain clients during all phases of the business cycle.

WeWork Case Study:

> "As far as WeWork is concerned, we're not competing with co-working spaces; we're not competing with office suites. We're competing with work. We think there's a new way of working in the world, and it's just better. For the millennials and everybody that understands collaboration and the sharing economy, that's just the right way for them." – Adam Neumann, WeWork's CEO and Founder

I had the privilege of interviewing John Zogg, Managing Director at Crescent Real Estate, and got his opinion on the long-term viability of co-working companies. When I asked him about how to determine which co-working company is best to enter into a lease with, he said, "there will be winners and losers, and as a landlord, we are working on trying and understanding their credit and who we want to partner with long term. These companies haven't experienced any economic downturn, so determining the winners and losers is imperative. There will be ones that make it, companies that merge, contractions, and ultimately losers." Following on that, Zogg believes that having a little exposure to co-working tenants provides value to a property by offering a service to that Crescent does not currently provide. Zogg also highlighted that WeWork has tremendous financial backing (Softbank) which makes him feel better about potentially signing a lease with them.

Looking for data that included a larger sample size, I searched to find a survey of real estate professionals. The National Real Estate Investor (NREI) recently surveyed 827 of its readers on current co-working trends. The majority of respondents believed that co-working companies would continue to grow the next year, but in the event of a recession, over 50% of respondents argued that "WeWork will face substantial challenges with a questionable outlook for its long-term viability (~ 40%)," and 12% of respondents believe that co-working companies will fail in a downturn.[30]

Valuation and IPO

On April 29th, 2019, word leaked that WeWork filed paperwork for an initial public offering (IPO) joining the year of unicorn IPOs. Despite the company's inability to produce a profit, the IPO is expected to be the second largest – behind only Uber – of the year. WeWork is a love/hate company that will likely create a clash among short-sellers and long-term growth believers. Look to Tesla as exhibit "A." Lack of assets could present a scenario where debtholders might gain control if shares drop too low.

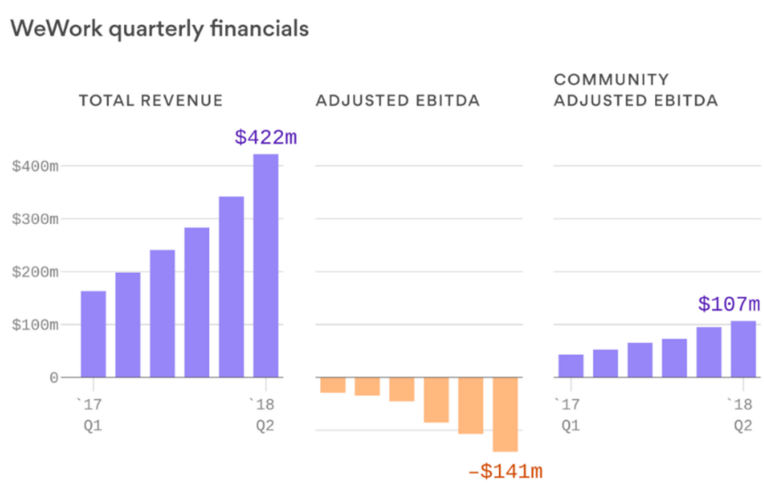
WeWork was not the first to market nor is there a moat protecting them from outside competitors. Access to Softbank's vast capital has allowed WeWork to grow faster and outspend competitors on advertising. For comparison, IWG – listed on NYSE – has 100,000 more desks than WeWork and only a $3 billion market capitalization (as of April 30th, 2019). What makes WeWork fifteen times more valuable than IWG?

[30] "Is WeWork Here to Stay, and Will It Turn Profitable? NREI Readers Weigh In with Their Prognosis." *National Real Estate Investor*, 4 Oct. 2018, https://www.nreionline.com/office/wework-here-stay-and-will-it-turn-profitable-nrei-readers-weigh-their-prognosis.

The Books: Unicorn Status

Below is additional WeWork financial data from bond offering documents:[31]

- In April 2018, WeWork issued $702 million of 7.875% notes due in May 2025. S&P rates them B+, four steps into junk (corporate rating scales by S&P, Moody's and Fitch). And Moody's, in an unusual move, withdrew its credit rating of the bonds last August, citing "insufficient or otherwise inadequate information." The bonds have been in the red for almost the entire time and closed today at 91.25 cents on the dollar, according to FINRA/Morningstar data.
- Revenue more than doubled between 2016 and 2017, from $436 million to $886 million. Nearly 93% of revenue is tied to membership.
- Net loss increased by 117.2% to $933 million. The largest expense increase was general/admin (+294%), followed by sales and marketing (+230%).
- $2.02 billion in cash at the end of 2017.



Community adjusted EBITDA – It called the fully adjusted number "community adjusted EBITDA," by which it subtracted not only interest, taxes, depreciation and amortization,

[31] "Digging into WeWork's New Financial Metric." *Axios*, https://www.axios.com/digging-into-weworks-commun-1524754857-0233de83-9b8f-4645-b594-a4298ca8c5f4.html. Accessed 18 May 2019.

but also basic expenses like marketing, general and administrative, and development and design costs. Those earnings were $233 million, WeWork said."[32]

It is important to note that WeWork's growing losses ($2B in 2018) are operating costs, not costs associated with growing capital. High tenant turnover leads to expensive marketing campaigns to attract replacement tenants. According to the Wall Street Journal, "the average annual revenue per member has dropped 13 percent from 2016 to $6,360."[33]

WeWork started in 2010 which was a recovering time for the real estate market with an abundance of office space vacancy. In the first years of business, WeWork had the ability to lease up space at the optimal period in the cycle, but the majority of WeWork's leases were signed in the past two years at peak cycle rates. WeWork's rent obligations will remain constant, but the predictability of its revenue is susceptible to macroeconomic trends.

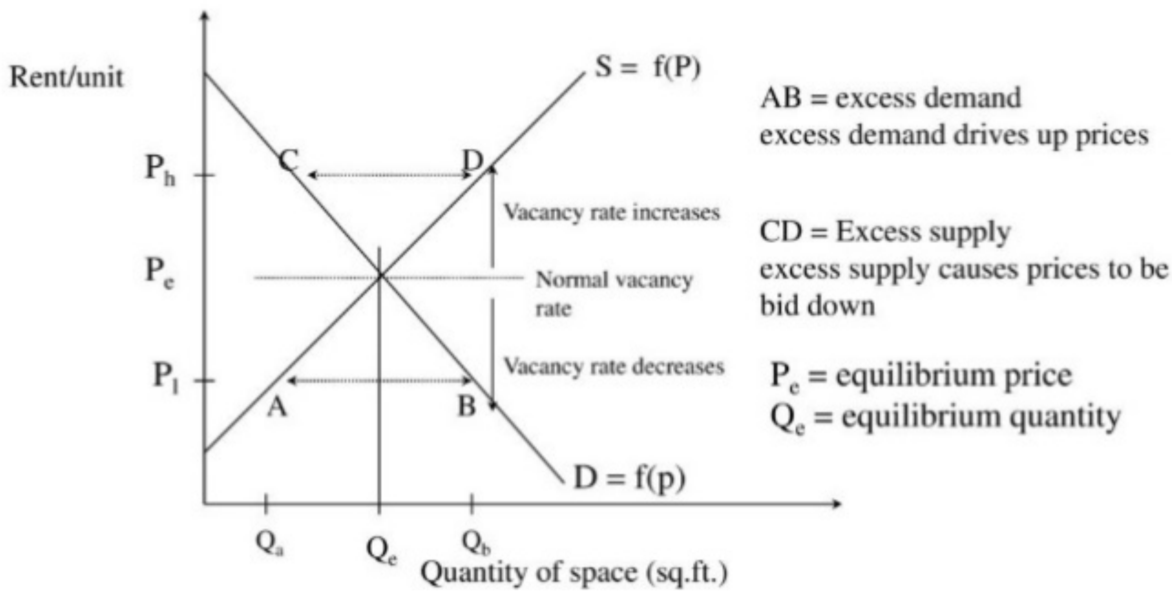


Figure 1Source: Greg Hallman

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[32] Brown, Eliot. "A Look at WeWork's Books: Revenue Is Doubling but Losses Are Mounting." *Wall Street Journal*, 25 Apr. 2018, https://www.wsj.com/articles/a-look-at-weworks-books-revenue-is-doubling-but-losses-are-mounting-1524657600.

[33] "The Downturn Is Coming. Can the We Company Survive the Storm?" *The Real Deal New York*, 24 Apr. 2019, https://therealdeal.com/2019/04/24/the-downturn-is-coming-can-the-we-company-survive-the-storm/

For comparable analysis, we need to identify what industry coworking companies operate in. WeWork founders have changed their tone on what kind of company they are, going from a real estate company to a software company to a service provider and now an all-encompassing "life" company. The next part of this thesis, we will analyze WeWork's viability as a retail service provider and as a real estate company.

Starbucks and WeWork:

"*Starbucks was one of the first companies to recognize the United States was in a recession.*"[34]

When I first visited a WeWork office, my immediate thought was that WeWork is just an expensive cup of joe. Starbucks began opening stores on every corner where new housing developments were completed during the subprime mortgage crisis. The home values matched Starbucks target market criteria, so it would be hard to blame Starbucks for expanding into markets that matched its profile. As the market crashed, so did Starbucks' revenue. Like Starbucks, WeWork signs a leases wherever it sees an opportunity to acquire space in markets with healthy employment numbers, even if they already have locations across the street. Another similarity between the companies is that they are renters, not owners, of space.

Not signing an additional monthly contract with WeWork should be a frictionless decision for the consumer as it should be one of the most manageable costs to cut out of his or her life, just like how people stopped going to Starbucks for a $5 coffee was an immediate change in consumer spending habit in 2008. McDonalds saw Starbucks overpriced coffee as a marketing strategy during the recession and released an ad camping with only four words, "Four bucks is dumb."[35] Following a 77% decline in net income, Starbucks introduced a breakfast

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[34] *Starbucks Reports 77% Earnings Decline - The New York Times*. https://www.nytimes.com/2009/04/30/business/30sbux.html. Accessed 18 May 2019.

[35] Flynn, Laurie J. "Starbucks Reports 77% Earnings Decline." *The New York Times*, 29 Apr. 2009, https://www.nytimes.com/2009/04/30/business/30sbux.html.

value meal to attract customers back to the coffee powerhouse. The new value-oriented strategy paid off as consumer spending increased the next quarter, but the company still shut down over 600 stores.[36] WeWork does have the ability to change the price per desk to meet current market demand, but if Starbucks is any indication, there will be location consolidations, price reductions, and an increase in marketing expenses.

[36] "Coffee Crisis? Starbucks Closing 600 Stores." *ABC News*, 1 July 2008, https://abcnews.go.com/Business/story?id=5288740&page=1.

WeWork as a Real Estate Company

"Real estate is just more real." – ***Steven Bowers***

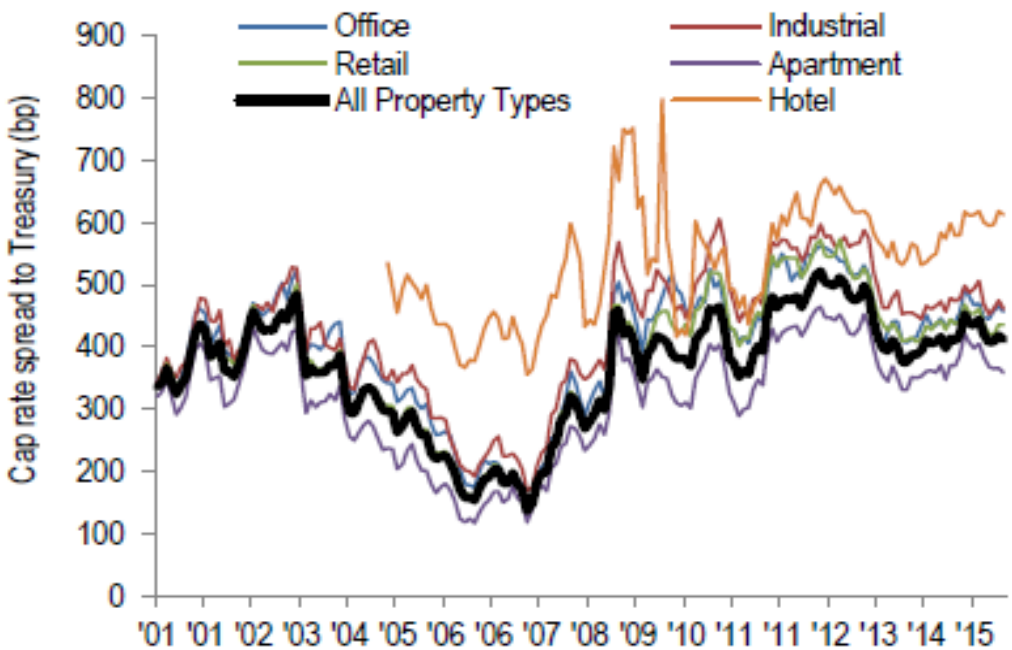
Barry Sternlicht, CEO of Starwood Capital Group which has $51 billion of assets under management had this to say about the latest tech unicorn, "If you had positioned this (WeWork) as a real-estate company, it wouldn't be worth this… Mr. Neumann dressed it up and made it into a community, and that turned into a tech play." The real estate veteran also stressed, "When these things go down, they do not go from $16 to $14, they go from $16 to $2. There is no elevator down, you hit the floor."

What would WeWork's valuation be if it owned its real estate instead of leasing? WeWork's 2.9M sq. ft in Manhattan would be worth about $3-5B (according to JLL, between 2012-2016 average price per square foot for Manhattan office space has ranged from $950 – $1,350). These next few pages will compare WeWork to property sectors and REITs that have similar business models. First, we will analyze how WeWork compares to the hotel industry.

> Although the hospitality industry has been improving at a significantly brisker pace than the economy as a whole, there is an ineluctable relationship between the GDP and demand for hotel rooms, says Jim Butler, chairman of the global hospitality group at Los Angeles-based Jeffery Mangels Butler & Mitchell LLP. Hotels' tenant base (a.k.a. revenue stream) gets hit the hardest in recessions.

Hospitality:

Chart 103: Cap rate spreads above 10-year Treasury yields, however, have been largely flat since the taper tantrum



Source: Real Capital Analytics

Risk in real estate is broken into two buckets: beta (systematic) and diversifiable (idiosyncratic). The beta risk for a property is lease risk. In real estate, hotels have the shortest lease length and therefore the highest beta. The image below shows cap rate spreads relative to the 10-year treasury yields for each real estate asset class. As stated previously, a cap rate is a property's risk-adjusted return:

Cap Rate = **10-Year Treasury**
+ Real Estate Risk Premium
- Expected NOI Growth

Hotels trade at the highest cap rate primarily due to the asset's inherent lease risk and the fact that travel is a considered a luxury expense. Vacation and business travel are highly correlated with the economy. A higher beta derives from hotel industry having a greater "**real estate risk premium**" relative to other real estate asset type, and since the lease term is on a nightly basis – with no lockins – the "**expected NOI growth**" turns negative faster than other property types. A high risk premium coupled with negative NOI growth shoots the cap rate up which drags the asset's value down. WeWork's revenue per member decreased 14% year over year, and losses doubled.

A bleak difference between WeWork and hotel conglomerates is that WeWork is still obligated to make the rent payments to the landlord whereas hotel companies only have to manage operating costs and service any debt. Landlords loan space and collect monthly rent checks over the life of the lease to service the loan. Under this logic, WeWork is extremely levered. The unicorn's only equity is a cash commitment from Softbank.

HQ was a publicly traded flexible office space provider in the early 2000s, and its value peaked at $3.4 billion. Shortly after the dotcom bubble, HQ's net income dropped year over year from $22M to a loss of $1.2M. Unable to cover its losses, HQ filed for chapter 11 bankruptcy protection.[37] The company attributed its collapse to adding layers of debt on top of their long-term lease obligations.

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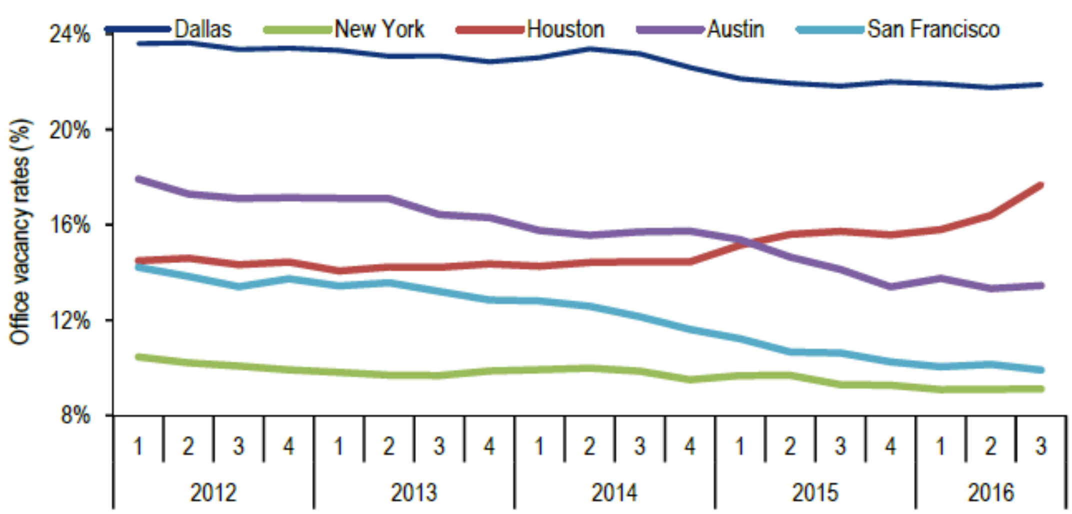
[37] *Now Worth $10 Billion, Is WeWork a 2000 Redux? - WSJ.* https://www.wsj.com/articles/now-worth-10-billion-is-wework-a-2000-redux-1436910924. Accessed 16 Apr. 2019.

Office:

Office is the other real estate property type we should discuss. Historically, office space has lower occupancy rates than other asset types. The average occupancy rate for office buildings in Dallas, Texas has historically been around 75-80%. WeWork's current average occupancy rate is 80% (down 4% from 2017). The company claims that the breakeven occupancy rate for any given property is 60%. While this is well below the average U.S. office occupancy rate, growing operating expenses -particularly marketing- and that the company is losing money at its current occupancy rate, makes me skeptical of the validity of this threshold. Furthermore, the company did not disclose what rent rate would make locations profitable at 60% occupancy.

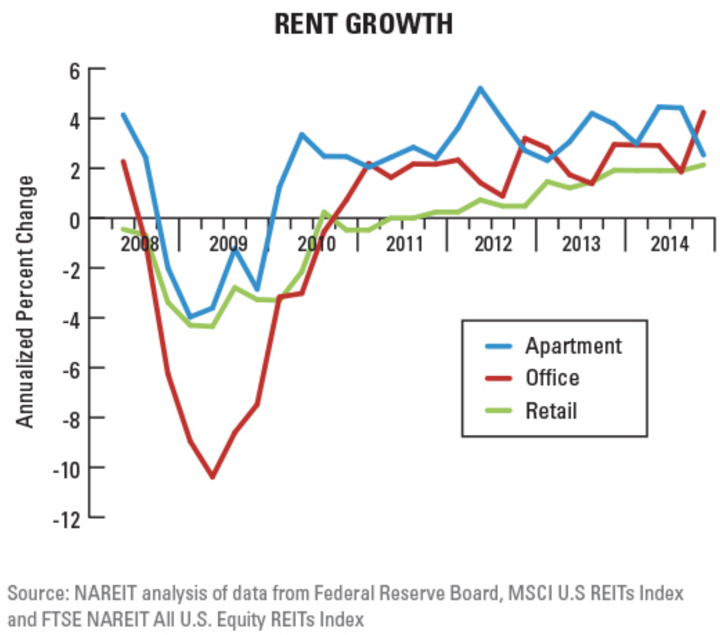
Chart 138: Year-to-date office vacancy rates jumped by over 2% year-to-date



Source: REIS

In fact, Houston realized the highest quarterly change in vacancy rates of all office markets tracked by REIS (Chart 139).

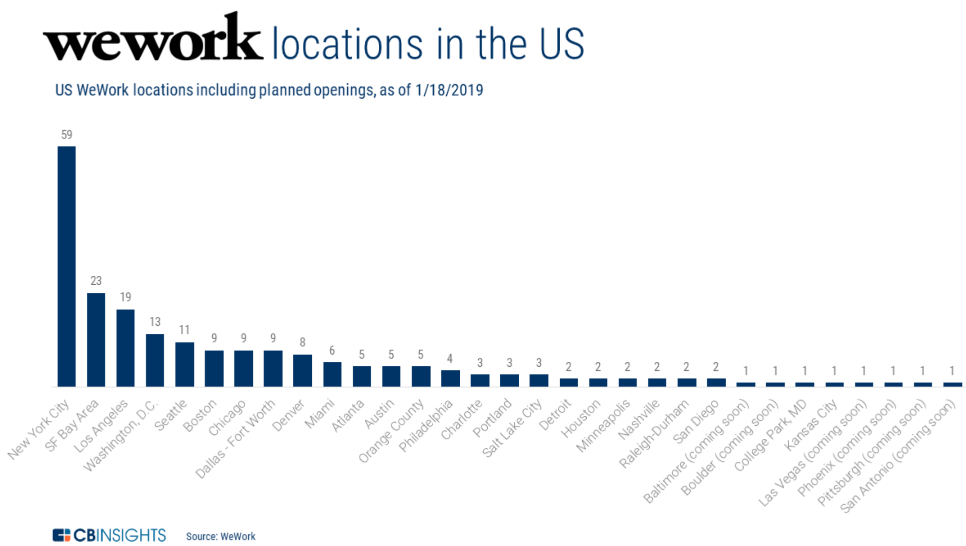
Historical office REIT performance provides empirical evidence about impacts macroeconomic factors that impact real estate. REIT managers aim to create a portfolio that is more conservative than other real estate companies.



The chart to the right illustrates annualized rent growth for class A office REITs. From the chart, you can see that office REITs experienced the most significant decrease in rent growth during the Global Financial Crisis (GFC). REITs are low leveraged, by industry standards, sign low risk tenants, and own core assets that produce steady NOI; therefore, I would expect WeWork which has much higher tenant risk, debt obligations, and unpredictable lease structures to experience greater rent loss than REITs. Betas according to Yahoo Finance are as follows: Boston Properties (BXP) = 1.08, Vornado Realty Trust (VNO)= 1.13. Both betas translate that BXP and VNO are slightly more volatile than the market, therefore, we can assume WeWork's beta to be greater than these two REITs.

Commercial Mortgage Backed Securities (CMBS):

WeWork is mostly concentrated in tier 1A markets and is the largest office tenant in New York City, London and Washington D.C. Commercial Mortgage Backed Securities (CMBS) in tier 1A markets have historically had lower default rates than lower-tier markets, but the growing presence of flexible office companies add a new layer of uncertainty to underwriting CMBS.[38] "CMBS exposure [to WeWork] has grown over the years, and KBRA – Kroll Bond Rating Agency – has identified 30 office and mixed-use whole loans, each secured by one property where WeWork is a tenant. In 22 of the 30 property locations, WeWork is the largest tenant."[39]



Long Correlation Trade:

WeWork's business model is to borrow long (long-term lease obligations) and lend short at a market premium. Companies in the business of borrowing long and lending short with little liquidity plunge fast when the economy takes a turn for the worst; companies that sold Credit

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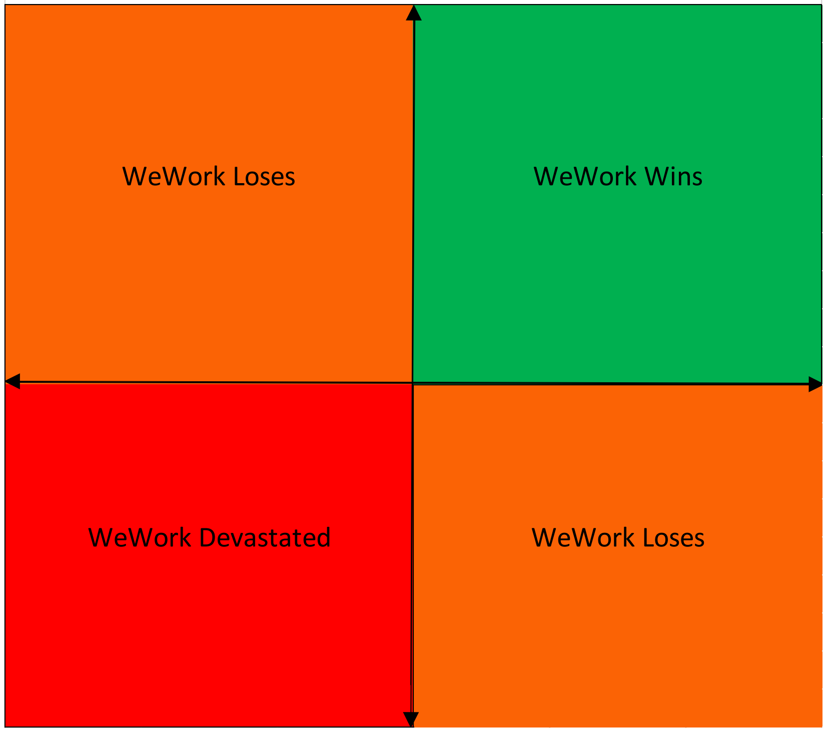
[38] Lisa Brown "WeWork in CMBS Is a Hot Investor Topic." *GlobeSt*, https://www.globest.com/2018/08/15/wework-in-cmbs-is-a-hot-investor-topic/. Accessed 30 Apr. 2019.

[39] *CoStar News - What, WeWorry?* https://product.costar.com/home/news/shared/194266. Accessed 10 April 2019.

Default Swaps (CDS) in the first decade of the 21st century – like AIG, Bear Sterns, and Lehman Brothers – became unable to meet their short-term obligations and went under. AIG thought that the default risk for any CDS was independent of one another, earthquake risk. While the success of WeWork's tenants might ebb and flow (uncorrelated) during good times of the economy (i.e., occupancy stays healthy as WeWork tenants' businesses are still running) the correlation during bad economic times will likely be more correlated.

With all these risks, why are landlords and REITs increasing the credit risk of their buildings by letting WeWork move in? While more information is needed, I think it is too hard for asset managers to turn down the opportunity to fill up their building; managers can't question your ability to lease your asset when your building is full and generating income returns to investors. Landlords may view signing WeWork as an arbitrage play. Vacant space generates no cash flow, but signing WeWork might increase risk but provides income now.

The Vertical Axis represnets office market performance & the horizontal axis represents demand for WeWork over its competitors. Source Troy Marcus, Central Texas President MIMCO Inc.



1. Top Right: If office market fundamentals strengthen and WeWork increases its market share of the coworking industry, WeWork will win because if demand for office space goes up, then rents will go up too. WeWork is locked-in to long-term leases and benefits if market rate for office space jumps since it can then arbitrage its rent price to people looking to lease from WeWork.
2. Top Left: In the event demand for office increases but demand for WeWork decrease then WeWork will fall below its occupancy rate and will have to slash rents.
3. Bottom Left: This is the worst case scenario for WeWork but the most likely in the event of a recession. Demand for office and WeWork drop. WeWork stuck paying long-term lease obligations signed at peak rents and in the event of a downturn market rent for new office leases would be lower, but WeWork is committed to its locked-in rate. Making

matters worse, demand for WeWork decreases, so the company has to lower rents below what they are paying for space and to keep desks filled.

4. Bottom Right This scenario is much like its diagonal counterpart. This is when WeWork will consolidate locations in cities where they have the most exposure. Office fundamentals decrease so the value of WeWork's signed lease goes down and will have to lower rents to attract users so by closing underperforming locations they can move those members to higher performing locations and increase occupancy.

Conclusion:

"Innovation is powerful… execution is worshiped." – Eriks Draiska

Through the comparisons that WeWork is similar to three other industries that struggle in recessions – luxury goods and service, the hospitality industry, and office space – I feel confident that WeWork, just as previous co-working giant Regus was during the dotcom bubble, will be under water during the next recession. Not only is WeWork similar to three of the most recession prone industries, but also has outstanding debt balances ($700M) and monthly lease obligations. As of 2018, the company had $5B in lease obligations due within the next five years - ~83M/month – and this number will rise as WeWork continues to scoop up more office space.

I believe an opportunity does exist within a potential WeWork collapse. The demand for flexible office space is undeniable but untested in a downturn. Uber's greatest strength of not owning its car fleet is WeWork's Achilles heel. Cars are bad investments losing 10% when driven off the lot and 10% annually after that. Core real estate, majority of the time, appreciates over time. Property owners – if well capitalized - can survive months of low occupancy as long as they can service any debt on the property. If WeWork had purchased buildings, in the beginning, the current losses might be better justified. In the event, WeWork is unable to meet outstanding rent and debt obligations, landlords will have the opportunity to repossess the uniquely built co-working space and hire a third party to manage the floor. I imagine a co-working property manager -like Greystar is in the apartment industry- will be in high demand.

Real Estate is a Service Industry

Customer service is another thing we can take away from consumer demand for WeWork.

Pre turn of the century (1999), Jeff Bezos was being interviewed by CNBC, transcript below:

> **Bezos**: "We (Amazon) has over 3,000 employees and over 4M SF of distribution center space, and those are things I am very excited about…If there is one thing Amazon.com is about, it is obsessive attention to the customer experience, end to end.
>
> **Interviewer**: "So you're not a pure internet play?"
>
> **Bezos**: "It doesn't matter to me whether we are a pure internet play. What matters to me is do we provide the best customer service."
>
> **Interviewer**: "Well it does matter to your investors, whether they are investing in a company…" Bezos interjects,
>
> **Bezos**: "No, they should be investing in a company that obsesses over customer experience. In the long-term there is never any misalignment between customer interests and shareholder interests."

Fast forward to 2019, Amazon is the country's most valuable publicly traded company and employs more people than live in Detroit.[40]

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[40] *Population Of Detroit 2018*. http://usapopulation2018.com/population-of-detroit-2018.html. Accessed 2 March 2019.

Bezos argues that obsessing over customer satisfaction is what makes Amazon great. Real estate companies, whether in leasing, development or investment all need to become more consumer-oriented first. Companies that think about what future users of space want, will better position themselves to meet that future demand.

Real estate will continue to become more service oriented. Consumers will continue to pay a premium for hotel-esque amenities and services. Developers will have to be willing to pay more for design to create demand for the finished product. Landlords will have to be more hands on tenants moving forward and will no longer be able to just provide four walls and a roof and expect monthly rent checks. Seasoned industry professionals need to realize they are not just selling square footage but rather an experience.

Further Research Required:

The last avenue we have to evaluate is the one that prompted its $46B valuation, which is WeWork as a data company. Which is where further research is required, but there is a case to be made about the value WeWork's data could provide. Tishman Speyer believes that tenant data could become more valuable than the real estate itself. WeWork uses sensor technology to monitor usage of space inside each of its locations. Data from these sensors can help monitor the building more efficiently - cutting down on operating expenses - and the data is used to determine optimal blueprints for office space.

As I started learning more about the co-working industry I began wondering about the macro impacts the growing service could have on the entire real estate industry, not just companies that have WeWork as a tenant. First, the amount of space absorbed by flexible office providers this cycle could potentially inflate occupancy rates. If so, higher than normal occupancy rates could signal developers that there is still demand for new office space to be built. Therefore, I think it would be interesting to see the impact co-working space has on market occupancy rates relative to natural industry benchmarks, and is if it is, could it be enough to create an office market bubble?

Chapter Five

Investment

"Commercial real estate is really a black box: its super opaque, and it's hard to get the information." – **Jason Calacanis**

Introduction:

Private real estate is becoming more synced with capital market cycles. Property type performance is more correlated now; location is not as dependent on different sectors of the economy as they once were. As evidenced by the mortgage default correlations in 2008, location is becoming ubiquitous. Real estate cycles are more closely tethered to economic cycles rather than overbuilding cycles as in the 1980s. This chapter analyzes how data is transforming real estate from a black box into an institutional asset class.

Financing:

The 32nd President of the United States hit real estate investment on the nose, “Real estate cannot be lost or stolen, nor can it be carried away. Purchased with common sense, paid for in full, and managed with reasonable care, it is about the safest investment in the world.” President Roosevelt is spot on – with the exception to urban blight cities like Detroit.

FDR hits on the nose is that real estate “paid for in full… is about the safest investment in the world.” Debt juices returns but also the risk. Since real estate is capital intensive and has high upfront costs, almost all real estate acquisitions or developments are financed with debt.

Market Debt: The United States mortgage market transformed from government policy looking to create an American Dream where most citizens could own a house to one of the largest betted asset classes. In 2006, the mortgage market became one of the world’s largest asset classes, debt outstanding on the underlying mortgages was $9.5 trillion.[41]

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[41] Fabozzi, et al. *Mortgage-Backed Securities: Products, Structuring, and Analytical Techniques*. Second Edition, Wiley, 2011.

Returns:

Real estate returns are broken down into two components: income and appreciation. Cash flows from operations (NOI) generate (10-25%) of the income streams and cash from reversion (sale of property) provides the juice of the return. Real estate assets are unique from the dirt, the psychical building itself, location and the occupiers of the space. For this reason, commercial buildings are sold via private bidding which invites the possibility of a winners curse.[42] By the unambiguous definition for market value, these characteristics make valuation difficult. Since real estate properties trade for the "market price" (i.e. most recent like-kind property sale price) as more capital pours into the market this creates an uptick in demand competing for a fixed amount of supply, creating a price appreciation domino effect. When the market tumbles the domino effect is price deprecation in nature and faster.

Few Players to a Lot of Big Players:

In 1960, Congress created a vehicle that gave real estate companies the ability to avoid double taxation (at the corporate level) and a tap into public equity markets. REITs provide retail investors an opportunity to invest in liquid real estate portfolios without high-upfront investment minimums. REITs are subject to securities reporting standard which creates more transparency in the real estate industry.

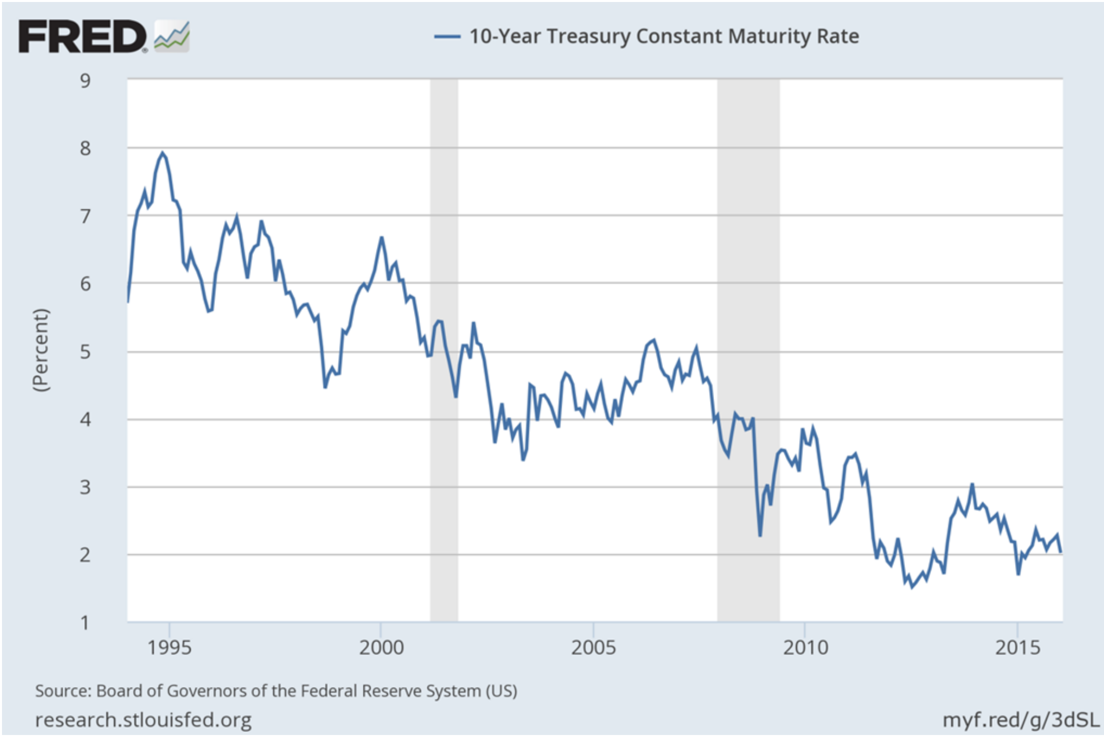
The favorable tax breaks REITs benefit from encourage other companies to qualify as a REIT. As more information gets transmitted more data centers and cell towers will be needed to keep up with demand, but data centers and cell towers are unique asset types. Product uniqueness is a risk involved in real estate because its value is tied directly to a particular functionality. Data and cell tower REITs have been on a tear outperforming equity REITs by about 15-20% over the

[42] The winner's curse is a phenomenon wherein the winning bid tends to exceed the assets true worth

past year, and a bullish portfolio manager at Cohen & Steers believes that demand for tech-related real estate will rise anywhere between 10-20 % each year through 2022 (Fung).

Foreign investors treat core U.S. real estate like saving accounts which contributes to real estate appreciation and asset bubbles. In 2015, foreign investment in real estate reached an all-time high and values skyrocketed. U.S. real estate has benefited from political controversy in other core markets. London is usually flock to quality market, but Brexit has encouraged foreign investors to deploy their capital elsewhere.

Pension fund managers look to create a low risk diverse portfolio with predictable returns. Pension funds are liability driven investors; meaning its investment strategy is to invest in assets that will cover present and future liabilities. Pension funds care about the sticks and bricks and expected future cash flows and potential dark spots (tenant turnovers). Pension funds allocating funds to real estate is not a new phenomenon, but it is at its highest allocation levels (as a percentage of total fund invested) since the 1980s.



In this low rate environment, bonds just aren't producing returns needed to satisfy pension liabilities, which is making real estate a more attractive alternative to investors. Interest rates are near all-time lows, so capital looking for more attractive yields than government bonds will continue to flow into real estate. Increased capital will drive up real estate prices. Pension funds trying to allocate their targeted investment allocation (10 – 15%) will put pressure on institutional investors to deploy the dry powder and avoid cash drag. With the amount of money in funds, sitting and already deployed, finding attractive deals that meet pension fund investment criteria is proving to be difficult. Therefore, pension funds will have to search for new asset classes, cities, and consider other real estate strategies like value-add, development, and consider investing in REITs. I imagine pension funds are going to have to deploy more capital into REITs to avoid cash drag. As a result, REIT share prices will rise in value and trade more like direct real estate.

Increased transparency has allowed for non-traditional real estate investors to more confidently enter secondary and tertiary real estate markets. Single-Family home rentals were perceived as a mom and pop business, but due to the number of distressed assets readily available, private equity firms bet on the housing market when nobody else would/could. Amid the Global Financial Crisis (GFC) well-capitalized wall street funds saw an opportunity to take advantage of undervalued residential assets at public auctions, and sent bankers across the country with briefcases of cash to purchase deeds at foreclosure auctions. Once the firms acquired enough properties, they would package them as a single family REIT. Blackstone Invitation Homes owns almost 50,000 rental properties.

> In unwinding their bank-owned properties, the GSEs [Fannie Mae, Freddy Mac, etc.], U.S. Treasury, and Federal Reserve innovated new structured transactions for disposing of hundreds of thousands of bank-owned homes, also known as real estate owned (REO). The Federal Reserve was the first to suggest that private equity firms were the one group with cash on hand to invest in foreclosed homes (Bernanke, 2012).
>
> In 2012, the Federal Housing Finance Agency (FHFA), conservator of the GSEs, issued a pilot to develop structured transactions that could be used to sell its REO homes in bulk. The private market followed by developing and standardizing financial instruments to allow broader market investment in converting foreclosed homes into single-family rentals. Rental housing, traditionally the purview of mom-and-pop landlords, caught the attention of large financial firms.

Real estate is becoming a more data-driven industry which will give larger corporations an advantage over smaller firms with less technology at their disposal. Just as Blackstone and Amherst entered the residential rental market, other large firms with better balance sheets and resources will compete directly with localized real estate companies. Further research beyond the scope of this paper would be needed to examine the entrance of investment banks into residential home markets might have on home attainability.

CONCLUSIONS

There is more money than ever trying to get into real estate, and developers build, that's what they do. We are going to permanently alter the next two hundred years of the human race for better or worse with these developments. Evidenced by the 1980s when the built environment doubled in size in a decade. Downtowns suffered for the following three decades and are finally be rejuvenated due to a population shift from the suburbs to cities. These buildings were all built pre-computer age and aren't as easily convertible to new open floor model. The buildings also lack amenities and design features that are demanded and built today. It is ever so important to incrementally develop to constantly be adjusting and adapting to changes in uses brought on by technological innovations.

Who knows what the word technology will even mean in fifty years. So how can we know how our built environment should be like? The word "technology" is derived from the 1th century Greek word "tekhnologia" which stood for "systematic treatment, from art, craft" the word has been used to describe revolutionary moments in civilizations. The steel plow, cotton gin, assembly line all were technological innovations that changed how we lived and used space, but most would not categorize those inventions as technological now. Today we associate technology with computers and the internet, but We would be ignorant to think "technology" will be associated with anything it is today in hundred years.

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